

REMARKS

Claims 1-23 are pending. Various claims are amended to more particularly set forth the invention. Claim 13 is amended to insert the limitations of original claim 1 and to obviate a rejection for indefiniteness. The specification has been amended to correct a grammatical error. The amendments do not constitute new matter.

The specification is objected to and the claims are rejected under 35 U.S.C. §§112, 102 and 103. For reasons set forth below, the rejections should be removed and the claims should be allowed to issue.

1. The Objection To The Specification Is Obviated

The specification is objected to for using the phrase “the molar concentration ratio of hydroxyl compound and enol ester” in paragraph 0016. As suggested by the Examiner, this phrase has been amended to refer to the “ratio of hydroxyl compound to enol ester.” Accordingly, the objection has been obviated.

2. The Objection To The Claims Is Obviated

Claims 1 and 23 are objected to for (claim 1) lacking an article before the word “atom” and (claim 23) being misnumbered as claim 22.

Claim 1 is amended to insert the article “an” before “atom” and to refer to atoms of the recited elements. Further, language from claim 1 imported into claim 13 has been corrected so recite “an atom.”

The numbering of actual claim 23 has been amended to be “23” rather than “22.”

3. The Claims Are Not Indefinite

Claims 2-3, 5-6, 11-14, 19 and 22 are rejected under 35 U.S.C. §112 as indefinite.

Claims 2 And 3 Are Not Indefinite

According to the Examiner, claim 2 is indefinite for reciting “a molar concentration ratio in the range of 25:1 to 1,000:1,” where the Examiner contends that because claim 1 does not refer to “moles of the enol ester, the palladium catalyst, and the range of the molar concentration ratio,” the recitation in claim 2 lacks antecedent basis. For essentially the same reason, claim 3 is contended to lack antecedent basis for “a molar concentration ratio not less than one.”

Applicants respectfully disagree. In both claim 2 and claim 3, the cited language uses the article “a” and therefore is not referring back to a recitation of claim 1. As such, it is an additional limitation which properly can be added in a dependent claim. Furthermore, since a molar concentration merely reflects the numbers of molecules present, it is an inherent property of the entities referred to in claim 1.

Claim 3 Is Not Indefinite

According to the Examiner, claim 3 is vague because “there is uncertainty as to which one of the hydroxy compound and the enol ester is more than one regarding its molar concentration ratio.”

Claim 3 is amended to more clearly state the nature of the molar concentration ratio.

Claims 5 And 6 Are Not Indefinite

According to the Examiner, claims 5 and 6 are indefinite for reciting “alkyl group containing,” because, according to the Examiner, the term “containing” could mean that there are additional components present.

Applicants respond that in claims 5 and 6 is it appropriate to use open language, as it would be likely that the alkyl group *would* contain other components, such as hydrogens or other substituent groups. The open-ended term “containing” does not render the claims indefinite.

Claims 11-14 Are Not Indefinite

With regard to claim 11-14, the basis for rejection is that the phrase “a compound containing” is, according to the Examiner, indefinite. In the amended claims, this language has been removed, so that the basis for the rejection is obviated.

Claims 19 And 20 Are Not Indefinite

The Examiner considers claims 19 and 20 indefinite for referring to “separating by vacuum distillation or solvent extraction the (palladium or acid) catalyst” because claim 1 does not refer to vacuum distillation or solvent extraction, to that the phrase allegedly lacks antecedent basis.

Applicants assert that dependent claims 19 and 20 are properly adding additional limitations, so that no antecedent basis in claim 1 is required.

None Of The Claims Are Indefinite

For all the foregoing reasons, the claims are not indefinite and the rejection should be withdrawn.

4. **The Claims Are Not Anticipated**

Claims 1, 3, 5-10, 14-15, 17, 20 and 23 are rejected under 35 U.S.C.

§102(b) as anticipated by Cesa et al., European Patent Specification 0144118 (“Cesa”).

According to the Examiner, Cesa discloses “the preparation of 2-hydroxy carboxylic acid by the reaction of enol acylates with carbon monoxide and an organic hydroxyl compounds to produce esters hydrolysable to hydroxy acids” (*e.g.*, in Example 11) and further shows hydrolysis of the product to lactic acid (*e.g.*, in Example 16). The Examiner contends that this is identical to the claimed invention.

In response, Applicants assert that Cesa does not anticipate the claims.

Cesa is mentioned - and distinguished - in the instant specification at paragraph 7, as follows:

[0007] European patent 0144188 provides a process for alkoxycarbonylation of enol esters with hydroxyl compounds using Pd, Rh and Ni catalysts and further hydrolysis of the products to hydroxy acids. However, the process operates at a low concentration of hydroxyl compound (<10 times of enol ester). In addition, the process does not provide catalyst separation method and reuse, showing inefficiency of the catalyst.

The preamble of claim 1 already refers to the reusable nature of the catalyst, but to emphasize this distinction, claim 1 has been amended to recite the step of “separating the palladium catalyst for re-use.”

Therefore, as Cesa does not teach separation and re-use of the catalyst, it cannot anticipate the claims, and the rejection should be withdrawn.

5. The Claims Are Not Obvious

Claims 1-12 and 14-23 are rejected under 35 U.S.C. §103(a) as obvious over Cesa in view of United States Patent No. 5,744,650 by Nicholson ("Nicholson").

The Examiner reiterates his characterization of Cesa, adding that Cesa "differs from the prior art in that the claimed hydrolysis catalyst is recycled for the hydrolysis step is unspecified; the claimed organic ligand contains pyridine and triethyl amine."

The Examiner characterizes Nicholson as disclosing a general carbonylation process in which one or more reactants are reacted in a solvent in the presence of carbon monoxide and palladium-organopolysphosphite ligand to produce a reaction product fluid, wherein the desired product can be separated by distillation, and wherein "the remaining non-volatilized catalyst containing liquid reaction mixture . . . is recycled back to the reactor." The Examiner contends that "Nicholson . . . expressly teaches that it is possible to apply the recycling step of the catalyst during the carbonylation process." The Examiner concludes that

it would have been obvious to the skilled artisan in the art to be motivated to incorporate the Nicholson's et al. recycling step into the Cesa et al process in order to economize the overall process because the skilled artisan in the art would expect such a combination to be successful and economical as the guidance shown in the Nicholson et al. process.

Applicants respectfully disagree. Unlike the present invention, which relates to preparation of hydroxyl acids, Nicholson relates to the production of aldehydes, and as such the reactants and products of the disclosed reactions are different from those addressed by the present invention. There would be no motivation for the skilled artisan

to combine Cesa and Nicholson because they are not sufficiently analogous pieces of art.

Moreover, if, for the sake of argument, Cesa and Nicholson were combined, there would be no reason to expect that catalyst could be successfully separated and re-used. For example, the process of Cesa could effectively exhaust the catalyst present. In fact, in the "Background of the Invention" of Nicholson, catalyst stability is disclosed as a major problem of the prior art, which would (if the references were able to be combined) include Cesa, filed thirteen years prior to Nicholson.

Accordingly, neither Cesa nor Nicholson nor their combination would render the claimed invention obvious, so that the rejection should be removed.

6. **Conclusion**

For all the foregoing reasons, Applicants request that the rejections be removed and that the claims be allowed to issue.

Respectfully submitted,
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